

National & State Standards for Middle School Industrial Technology / Technology

The Standards for Technological Literacy (Content for the Study of Technology) –Clearly lists all content standards with precise benchmarks in order to obtain student knowledge of the standards. Also with each standard is a Vignette, of clear illustration of a class project and assignments that can meet the listed Standards & Benchmarks.

For a copy of the “Standards for Technological Literacy” go to www.OnlineTechnologyCurriculum.com Also see “Implementation in Action” to see how MN is addressing the need for implementation.

THE NATURE OF TECHNOLOGY

1

The Characteristics and Scope of Technology – *Students will develop an understanding of the characteristics and scope of technology.*

- Benchmark Topics
 - Usefulness of technology
 - **BM F** New products and systems can be developed to solve problems or to help do things that could not be done without the help of technology
 - For example, engines increased the speed at which people can travel, and pumps move water to locations where it is needed. The use of technology sometimes helps to improve personal lives by lessening threats, such as disease, toil, or ignorance. However, the desire or need for a new product or system can cause negative consequences, such as when people travel long hours to work in order to pay for improvements for their homes or child and healthcare.
 - Development of technology
 - **BM G** The development of technology is a human activity and is the result of individual or collective needs and the ability to be creative
 - Making life easier involves generating new products and systems through creativity and innovation. For example from the time of the first gas cook stove in 1936 to the time of the microwave oven in 1967, the focus was on simplifying the process of cooking and reducing the time of food preparation.
 - Human creativity and motivation
 - **BM H** Technology is closely linked to creativity, which has resulted in innovation
 - Most inventions are inspired by perceived needs and wants – the hairbrush, for example. Other inventions are linked to developing creative ideas and the way a person uses them, not necessarily their intended use. For example, the invention of the tea bag grew out of a packaging strategy to replace expensive tin containers. Although tea was packaged in small silk bags to give away as samples, some users thought it was a new way to brew the tea, and thus the tea bag was born. An invention can always be improved, and trying new ideas is often key to that improvement.
 - Product demand
 - **BM I** Corporations can often create demand for a product by bringing it onto the market and advertising it.
 - Although market demand generally determines the success or failure of a technology, companies often develop products or systems before a need is identified. In order for a technology to be profitable, there must be a market for it—either preexisting or created through an advertising campaign. The promotion of a product or system often determines its popularity and demand.

2

The Core Concepts of Technology – *Students will develop an understanding of the core concepts of technology.*

- Benchmark Topics
 - Systems
 - Resources
 - Requirements
 - Trade-offs
 - Processes
 - Controls

3

The Relationships Among Technologies and the Connections Between Technology and Other Fields – *Students will develop and understanding of the relationships among technologies and the connections between technology and other fields of study.*

- Benchmark Topics
 - Interaction of systems

- Interrelation of technological environments
- Knowledge from other fields of study and technology

TECHNOLOGY AND SOCIETY

4

The Cultural, Social, Economic, and Political Effects of Technology – Students will develop an understanding of the cultural, social, economic, and political effects of technology.

- Benchmark Topics
 - Attitudes toward development and use
 - Impacts and consequences
 - Ethical issues
 - Influences on economy, politics, and culture

5

The Effects of Technology on the Environment – Students will develop and understanding of the effects of technology on the environment.

- Benchmark Topics
 - Management of waste
 - Technologies repair damage
 - Environmental vs. economic concerns

6

The Role of Society in the Development and Use of Technology – Students will develop an understanding of the role of society in the development and use of technology.

- Benchmark Topics
 - Development driven by demands, values, and interests
 - Inventions and innovations
 - Social and cultural priorities
 - Acceptance and use of products and systems

7

The Influence of Technology on History – Students will develop an understanding of the influence of technology on history.

- Benchmark Topics
 - Processes of inventions and innovations
 - Specialization of Labor
 - Evolution of techniques, measurement, and resources
 - Technological and scientific knowledge

DESIGN

8

The Attributes of Design – Students will develop an understanding of the attributes of design.

- Benchmark Topics
 - Design leads to useful products and systems
 - There is no perfect design
 - Requirements

9

Engineering Design – Students will develop an understanding of engineering design.

- Benchmark Topics
 - Iterative
 - Brainstorming
 - Modeling, testing, evaluating, and modifying

10

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving – Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

- Benchmark Topics
 - Troubleshooting
 - Invention and innovation
 - Experimentation

ABILITIES FOR A TECHNOLOGICAL WORLD

11

Apply the Design Process – Students will develop the abilities to apply the design process.

- Benchmark Topics
 - Apply design process
 - Identify criteria and constraints
 - Model a solution to a problem
 - Test and evaluate

- Make a product or system

12 Use and Maintain Technological Products and Systems – Students will develop the abilities to use and maintain technological products and systems.

- Benchmark Topics
 - Use information to see how things work
 - Safely use tools to diagnose, adjust, and repair
 - Use computers and calculators
 - Operate systems

13 Assess the Impacts of Products and Systems – Students will develop the abilities to use and maintain technological products and systems.

- Benchmark Topics
 - Design and use instruments to collect data
 - Use collected data to find trends
 - Identify trends
 - Interpret and evaluate accuracy of information

THE DESIGNED WORLD

14 Medical Technologies – Students will develop an understanding of and be able to select and use medical technologies.

- Benchmark Topics
 - Advances and innovations in medical technologies
 - Sanitation processes
 - Immunology
 - Awareness about genetic engineering

15 Agricultural and Related Biotechnologies – Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.

- Benchmark Topics
 - Technological advances in agriculture
 - Specialized equipment and practices
 - Biotechnology and agriculture
 - Artificial ecosystems and management
 - Development of refrigeration, freezing, dehydration, preservation, and irradiation

THE DESIGNED WORLD (Continued)

16 Energy and Power Technologies – Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.

- Benchmark Topics
 - Energy is the capacity to do work
 - Energy can be used to do work using many processes
 - Power is the rate at which energy is converted from one from to another
 - Power systems
 - Efficiency and conservation

17 Information and Communication Technologies – Students will develop an understanding of and be able to select and use information and communication technologies.

- Benchmark Topics
 - Information and communication systems
 - Communication systems encode, transmit, and receive information
 - Factors influencing the design of a message
 - Language of technology

18 Transportation Technologies – Students will develop an understanding of and be able to select and use transportation technologies.

- Benchmark Topics
 - Design and operation of transportation systems
 - Subsystems of transportation system
 - Governmental regulations
 - Transportation processes

19 Manufacturing Technologies – Students will develop an understanding of and be able to select and use manufacturing technologies.

- Benchmark Topics
 - Manufacturing systems

- Manufacturing goods
- Manufacturing processes
- Chemical technologies
- Materials use
- Marketing products

20

Construction Technologies - *Students will develop an understanding of and be able to select and use construction technologies.*

- Benchmark Topics
 - Construction designs
 - Foundations
 - Purpose of structures
 - Building systems and sub-systems